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Graduate School Number

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BULLETIN OF THE UNIVERSITY OF NEW HAMPSHIRE

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The Bulletin is published in September, October, November, December, January, February, March and April, and includes:

The Catalog of the University
The Report of the President
The Financial Report
The Catalog of the Summer School
The Illustrated Booklet
The Catalog of the Graduate School
and other publications of the University.

UNIVERSITY CALENDAR

1932–1933

SUMMER SESSION

July 5	Tuesday	Registration Day
July 6	Wednesday	Classes begin at 8 A.M.
Aug. 13	Saturday	Summer Session closes at 4 P.M.

FALL TERM

1932

Sept. 13	Tuesday	Matriculation Day—Freshman Class
Sept. 19	Monday	Registration Day—All Classes
Sept. 20	Tuesday	Recitations begin at 8 A.M.
Sept. 21	Wednesday	University Day—Afternoon holiday
Oct. 21	Friday	Annual Meeting of Board of Trustees
Oct. 22	Saturday	Home-coming Day
Oct. 28	Friday	Mid-Term warnings to be filed, 5 P.M.
Nov. 19	Saturday	Dads' Day
Nov. 23	Wednesday	Thanksgiving recess—Wed., 12:30 P.M. to Fri., 8 A.M.
Dec. 12–16	Mon.–Fri.	Fall Term examinations
Dec. 16	Friday	Fall Term closes at 4 P.M.

WINTER TERM

1933

Jan. 2	Monday	Registration Day
Jan. 3	Tuesday	Classes begin at 8 A.M.
Jan. 20	Friday	Meeting of Board of Trustees
Jan. —	Fri., Sat.	Winter Carnival, Fri., 12:30 P.M. to Sat., 12:30 P.M.
Feb. 7	Tuesday	Mid-Term warnings to be filed, 5 P.M.
Mar. 14	Tuesday	Town Meeting
Mar. 13–17	Mon.–Fri.	Winter Term examinations
Mar. 17	Friday	Winter Term closes at 4 P.M.

UNIVERSITY OF NEW HAMPSHIRE

SPRING TERM

1933

Mar. 27	Monday	Registration Day
Mar. 28	Tuesday	Recitations begin at 8 A.M.
Apr. 21	Friday	Meeting of Board of Trustees
May 2	Tuesday	Mid Term warnings to be filed, 5 P.M.
May 13	Saturday	Mothers' Day
May 30	Tuesday	Memorial Day—Holiday
June 5–9	Mon.–Fri.	Spring Term examinations
June 7	Wednesday	Senior examinations close at 4 P.M.
June 10	Saturday	Class Day—Alumni Day—Meeting of Board of Trustees
June 11	Sunday	Baccalaureate Day
June 12	Monday	Commencement Day

BOARD OF TRUSTEES

His Excellency, Governor John G. Winant, A.M., LL.D., *ex officio*

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Roy D. Hunter, *President* — Claremont
June 14, 1916 to June 30, 1933

Elizabeth C. Sawyer — Dover
July 12, 1925 to June 30, 1934

*Albert H. Brown, B.S., *Secretary* — Strafford
September 1, 1925 to June 30, 1932

Harry D. Sawyer — Woodstock
September 15, 1926 to June 30, 1934

James A. Wellman, B.S. — Manchester
January 26, 1928 to June 30, 1935

Robert T. Kingsbury — Keene
January 27, 1928 to June 30, 1932

John W. Pearson, A.B. — Concord
January 26, 1928 to June 30, 1932

Albertus T. Dudley, A.B. — Exeter
June 14, 1928 to June 30, 1933

*Charles H. Hood, D.SC. — Charlestown, Mass.
May 6, 1929 to June 30, 1935

George T. Hughes, A.M. — Dover
July 1, 1931 to June 30, 1935

*Elected by Alumni.

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GRADUATE STUDY AND ADVANCED DEGREES

AIMS

The Graduate School aims to meet the needs of *superior students* who are preparing to become teachers in colleges or universities, or investigators, and to offer opportunities to qualified students for a more advanced training than that which they may obtain in an undergraduate course.

ADMINISTRATION

Graduate work is offered, under the supervision of the Dean of the Graduate School, by competent members of various departments of instruction and research. These members constitute the Faculty of the Graduate School.

The general administrative functions of the Faculty are delegated to the Dean and the Council.

ADMISSION

A student who holds a bachelor's degree, or its equivalent, from an approved college or university, may be admitted to graduate study. In general a student must have credit in not less than 90 time units, or the equivalent, in the department in which he wishes to be admitted to major.

Admission to graduate study does not necessarily imply admission to candidacy for an advanced degree. Students who are not planning to become candidates for an advanced degree may be admitted to graduate study upon the recommendation of the heads of the departments concerned, and with the approval of the Dean of the Graduate School.

A student may major only in the departments represented in the catalog of the Graduate School. However, a graduate student may be admitted to graduate study in departments not represented in the Graduate School catalog upon recommendation of the departments concerned and with the approval of the Graduate Council.

GRADUATE SCHOOL

TUITION AND FEES

Tuition is $150 for residents of New Hampshire and $250 for non-residents. For non-resident students who entered the University before the end of the college year 1927–28, the tuition is $225. Tuition is paid in advance in three equal installments, one on the first day of each term.

A diploma fee of $5 is charged upon graduation. Charges will be assessed for extraordinary breakage or damage. No laboratory or course fees are charged. Payment of the tuition fee entitles the student to admission to all varsity athletic games and contests.

Members of the regular university staff (and their immediate families) registered for 30 or more time units shall be granted scholarships. A scholarship will reduce the tuition charge to $25 per term. Members of the regular university staff and their immediate families registering for less than 30 time units will be required to pay $.50 for each time unit.

HONORARY FELLOWSHIPS FOR VISITING SCHOLARS

Professors or other eminent scholars who may desire temporarily the privileges of the library and the research facilities of the University, and who are not candidates for a degree, may, upon recommendation of the Dean of the Graduate School and the approval of the President of the University, be appointed Honorary Fellows without stipend. Honorary Fellows shall not be required to pay any charges except, possibly, the cost of unusually expensive supplies or equipment.

ASSISTANTSHIPS AND SCHOLARSHIPS

Graduate assistantships which usually require half-time service at a stated salary are available in a number of departments. Graduate assistants pay tuition in accordance with the regulation pertaining to the members of the college staff. The residence requirement for a Master's degree for holders of these appointments is not less than two years.

A limited number of superior students are awarded exemption from tuition. These awards are subject to the maintenance of a high scholarship record in the Graduate School and may be revoked by the Committee on Exemption of Tuition at the end of any term, if, in their judgment, the student does not merit such exemption for the subsequent terms.

Inquiries regarding these assistantships and scholarships should be addressed to the head of the department concerned.

SUPPLIES

Books, drawing instruments, materials, etc., may be purchased at the University bookstore in Thompson Hall.

ROOMS

Because of the congestion of undergraduate students in the dormitories of the University, it is impossible to guarantee reservation of rooms to graduate students. Rooms may be secured in private houses at prices ranging from $85 to $150 per year.

Women students, unless living at home, are required to room in the women's dormitories, or in approved houses. A competent matron is in charge of each women's dormitory.

BOARD

The University operates on a self-service basis a modern, well-appointed Commons. Both regular weekly board and cafeteria service are provided. Exact cost records are kept, and prices are adjusted in such a manner as to give students the advantage of changing costs.

REGISTRATION

A student desiring to register for graduate study must submit to the Dean of the Graduate School the official application for admission to graduate study. Blanks for this purpose may be obtained from the Dean's Office.

Upon admission to graduate study, a student first pays his fee at the Business Office and then deposits his enrollment cards with the Registrar.

REQUIREMENTS FOR GRADUATE CREDIT

Graduate credit will not be allowed to undergraduate students unless such credit has been approved in advance by the Dean of the Graduate School.

A graduate student taking a course for graduate credit which is not primarily for graduates shall be required to do additional work beyond that required of undergraduates who are taking the same course.

Graduate credit may be given for courses not listed in the Graduate School catalog if such credit is recommended by the major and minor departments concerned, and approved by the Dean of the Graduate School.

A student will not receive graduate credit for a course in which he has obtained a grade lower than 70.

GRADUATE SCHOOL

ADVANCED DEGREES

Two types of advanced degrees are conferred: (a) Master of Science, Master of Arts, and Master of Education in the respective "major" subjects, given only in course, and (b) the professional degrees, Mechanical Engineer, Electrical Engineer, and Civil Engineer, conferred only upon graduates of this institution, and based upon the quality of their professional work and the presentation of a satisfactory thesis. Information in regard to the professional degrees may be obtained from the Dean of the College of Technology.

REQUIREMENTS FOR THE MASTER'S DEGREE

Residence.—A minimum of one full academic year, or four summer sessions, in residence is required.

Credits.—An average grade of at least 80 in not less than 150 time units is required, of which not less than 80 or more than 100 time units shall be devoted to the major subject (including the thesis), and not less than 30 or more than 50 time units shall be devoted to the minor subjects. Work in allied departments will be accepted for credit provided such work is properly correlated with the major subject. Not over 50 time units may be given for a thesis. Of the total time units required for an advanced degree, not more than half will be allowed a candidate on admission from another institution. Credits for the thesis shall be recorded in the Registrar's office as "Thesis Credits."

Candidacy.—At least six months previous to the time the degree is sought, an application for admittance to candidacy must be submitted to the Council for its approval; and if a thesis is required, the candidate must file with the Council, for its approval, a brief outline of the thesis project as recommended by the head of the department in which the thesis work is being done.

Examinations.—All candidates must meet the regular departmental requirements as to examinations in the courses for which they are registered and the requirement of a special comprehensive examination, by the heads of the departments in which the major and minor subjects have been taken, at any time designated by the departments concerned. In addition, the candidate must pass an oral examination by a special committee designated by the Council and including the heads of the departments in which the major and minor subjects have been taken before the candidate may be recommended for the Master's degree.

Thesis.—All theses must be typewritten upon standard paper, eight and one-half by eleven inches, medium weight, neatly bound in a black cloth cover, gilt-lettered on the outside cover with the title, name of author, degree sought, and year of graduation. The title page should bear the following statement: "A thesis submitted to the University of New Hampshire in partial fulfillment of the requirements for the degree of Master of Arts (Master of Science) in (name of 'major' subject)."

Whenever a thesis is printed in any periodical, it must be designated as having been accepted as a Master's thesis by the University of New Hampshire.

Two bound copies must be filed before Commencement Day, one with the Librarian and one with the head of the department in which the major work has been done. The copy filed with the Librarian must be the original, not a carbon copy.

DESCRIPTION OF COURSES

AGRICULTURAL AND BIOLOGICAL CHEMISTRY

THOMAS G. PHILLIPS, *Professor*
STANLEY R. SHIMER, *Assistant Professor*

Students majoring in this department are expected to have had preparation in the biological sciences, in physics and in general, analytical and organic chemistry. Physical chemistry and a reading knowledge of German or French are desirable. The library and equipment of the Experiment Station are available for the use of graduate students.

COURSES FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS

4-a. Physiological Chemistry. An advanced study of the chemistry of the fats, carbohydrates and proteins, and some of the general applications of chemistry to biology, such as colloids and enzyme action.

Prerequisite: Agricultural Chemistry 2–b or 24–b or equivalent preparation in Organic Chemistry and Quantitative Analysis. Lec., 2 hrs.; lab., 5 hrs.; prep., 3 hrs.; 10 units.

5-b. Physiological Chemistry. The chemistry of animal physiology, including foods, digestion, metabolism and excretion.

Prerequisite: Agricultural Chemistry 4–a. Lec., 2 hrs.; lab., 5 hrs.; prep., 3 hrs.; 10 units.

6-b. Plant Chemistry. A study of the chemistry of plant growth and development, and methods for the analysis of plant materials.

Prerequisite: Agricultural Chemistry 4–a. Given only in alternate years beginning with 1932–33. Lec., 2 hrs.; lab., 5 hrs.; prep., 3 hrs.; 10 units.

7-a, 8-b, 9-c. Agricultural Analysis. A study of the methods of analysis of fertilizers, feeding-stuffs and other products important in Agriculture.

Prerequisites: At least 15 units in Quantitative Analysis and 20 units in Organic Chemistry. Lab., 8 hrs.; prep., 2 hrs.; 10 units.

19-c. Dairy Chemistry. A study of the chemistry and methods of analysis of milk and other dairy products.

Prerequisite: Agricultural Chemistry 2–b or equivalent preparation in Organic Chemistry and Quantitative Analysis. Given only in alternate years beginning with 1932–33. Lec., 1 hr.; lab., 5 hrs.; prep., 2 hrs.; 8 units.

21–c. Physiological Chemistry. The qualitative and quantitative examination of blood and urine.

Prerequisite: Agricultural Chemistry 5–b. Lec., 2 hrs.; lab., 5 hrs.; prep., 3 hrs.; 10 units.

COURSES PRIMARILY FOR GRADUATE STUDENTS

10–a, 11–b, 12–c. Advanced Biochemistry. The preparation, composition and analysis of proteins, carbohydrates and fats. Readings, discussions and laboratory work. 10 units each.

13–a, 14–b, 15–c. Special Problems. Conferences, library and laboratory work on such topics as enzymes, physico-chemical methods, and certain phases of plant or animal nutrition and metabolism. Subject matter and credits to be arranged.

16–a, 17–b, 18–c. Seminar. 3 units each.

BOTANY

O. R. BUTLER, *Professor*
MARIAN E. MILLS, *Assistant Professor*
STUART DUNN, *Instructor*

MAJOR: Students majoring in Botany must have fulfilled undergraduate major requirements or their equivalent.
MINOR: Students taking a minor in Botany must have had at least 24 units in Botany and 30 units in Chemistry.

20–a. Morphology of the Algae. Study of the habits, structure, life histories and relationships of the various groups of the algae.

Lab., 6 hrs.; assigned reading, 2 hrs.; 8 units. Given in alternate years with 24–a.

21–a and –b. Morphology of the Bryophytes and Pteridophytes. Study of the structures, life histories and relationships of the liverworts, mosses, ferns and fern allies.

Lab., 6 hrs.; assigned reading, 2 hrs.; 8 units.

22–c. Morphology of Gymnosperms. Study of the structure, life histories, relationships and classification of gymnospermous plants.

Prerequisite: Botany 26–a. Lab., 6 hrs.; assigned reading, 2 hrs.; 8 units. Given in alternate years with 23–c.

23–c. Morphology of Angiosperms. Study of the structures, life histories and classification of the flowering plants.

Prerequisite: Botany 26–a. Lab., 6 hrs.; assigned reading, 2 hrs.; 8 units. Given in alternate years with 22–c.

24–a. Plant Ecology. A study of the external factors affecting the plants' economy, structure, duration of life and topographical distribution of species; plant communities, plant associations, and plant succession.

Prerequisite: Botany 25–c. Conferences, assigned reading and reports; 5 units. Given in alternate years with 20–a.

25–c. Systematic Botany. A study of the higher plants of our native flora. The student is required to prepare an herbarium of 90 plants.

Prerequisite: Botany 1–a, 2–b, 3–c. Conferences, field and laboratory work; 8 units.

26–a. Plant Histology. General morphology of the tissue systems; the primary tegumentary tissue; the fundamental tissue system, the vascular tissue system, development of secondary members, formation of secondary tissue.

Prerequisite: Botany 6–a. Lab., 8 hrs.; assigned reading, 2 hrs.; 10 units.

27–a. Plant Physiology. A study of imbibition, osmosis, absorption, conduction, transpiration, guttation and the effect of environmental factors upon these phenomena; water relations of plants.

Prerequisite: Botany 5–c. Lab., 8 hrs.; assigned reading, 2 hrs.; 10 units.

28–b. Plant Physiology. A study of mineral nutrition, photosynthesis, physical and chemical properties of chlorophyll, effect of external and internal conditions on carbon dioxide assimilation, products of assimilation, photoperiodism.

Prerequisite: Botany 5–c. Lab., 8 hrs.; assigned reading, 2 hrs.; 10 units.

29–c. Plant Physiology. Digestion of carbohydrates and fats, hydrolysing enzymes, respiration, oxidising enzymes, intramolecular respiration, digestion of proteids, proteolytic enzymes, effect of external conditions on growth, paratonic and autonomous movements.

Prerequisite: Botany 5–c. Lab., 8 hrs.; assigned reading, 2 hrs.; 10 units.

30–a, –b, –c. Literature of Plant Physiology. Assigned reading of monographs and other important literature of plant physiology.

Prerequisite: Botany 5–c. Conferences and written reports. Credits to be arranged.

31–a, –b. Diseases of Fruits. The bacterial and fungous diseases of fruits, their symptoms, cause and prevention.

Prerequisite: Botany 13–b. Lab., 5 hrs.; assigned reading, 2 hrs.; 7 units. Given in alternate years with 32–a, –b.

32–a, –b. Diseases of Vegetables. The bacterial and fungous diseases of vegetables, their symptoms, cause and prevention.

Prerequisite: Botany 13–b. Lab., 5 hrs.; assigned reading, 2 hrs.; 7 units. Given in alternate years wth 31–a, –b.

33–b. Fungicides. Preparation and use of fungicides and a study of their effect upon the higher plants and parasitic organisms.

Prerequisite: Botany 13–b. Lab., 6 hrs.; assigned reading, 2 hrs.; 8 units.

34–a. Mycology. Morphology, physiology and classification of the Schizomycetes, Myxomycetes, and Phycomycetes.

Lab., 6 hrs.; assigned reading, 2 hrs.; 8 units.

35–b. Mycology. Morphology, physiology and classification of the Ascomycetes, Basidiomycetes and Fungi imperfecti.

Lab., 6 hrs.; assigned reading, 2 hrs.; 8 units.

CHEMISTRY

HAROLD A. IDDLES, *Professor*
HEMAN C. FOGG, *Assistant Professor*
LAWRENCE H. OPDYCKE, *Assistant Professor*
JAMES A. FUNKHOUSER, *Assistant Professor*
RICHARD H. KIMBALL, *Assistant Professor*

Graduate study in chemistry is open to those who have completed the chemistry curriculum of either the College of Liberal Arts or the College of Technology, or some similar course of study. Excellent opportunities are offered for research in General and Analytical Chemistry, Organic Chemistry and Physical Chemistry.

COURSES FOR ADVANCED UNDERGRADUATES AND GRADUATES

100–a, 101–b, 102–c. Advanced Inorganic Chemistry. A course of study of the elements from the standpoint of the periodic law. Topics stressed in addition to the rarer elements are atomic structure, crystal structure, Werner's theory of complex compounds. Laboratory work deals with the preparation of pure inorganic substances by different methods applicable to the chief classes of inorganic compounds.

Prerequisite: A general course in Inorganic Chemistry and Quantitative Analysis. Lec., 2 hrs.; lab., 2½ hrs.; prep., 3 hrs.; 7½ units.

152–a, 153–b, 154–c. Advanced Organic Chemistry. A consideration of the more advanced theories of organic chemistry.

Prerequisite: One year of Organic Chemistry. Rec., 3 hrs.; prep., 4½ hrs.; 7½ units.

160–a, 161–b, 162–c. Physical Chemistry. A study of chemical theory, covering vapor density, molecular weights, specific heat, diffusion of gases, solutions, ionization, catalysis, colloids, thermochemistry, equilibrium, the phase rule, etc.

Prerequisites: Chemistry 29–c, Mathematics 8–b, Physics 8–c. Rec., 3 hrs.; prep., 4½ hrs.; 7½ units.

163–a, 164–b, 165–c. Physical Chemistry Laboratory.

Prerequisite or parallel: Physical Chemistry lectures. Lab., 5 hrs.; prep., 2 hrs.; 7 units.

Courses Primarily for Graduate Students

200–a. History of Chemistry.

Prerequisites: Acceptable courses in Organic and Physical Chemistry. Lec., 3 hrs.; prep., 4½ hrs.; 7½ units.

201–b, 202–c. Chemistry of the Rarer Elements and Rare Earths. An introduction to this field of chemistry.

Lec., 3 hrs.; lab., 2½ hrs.; prep., 4½ hrs.; 10 units.

206–a, 207–b, 208–c. Advanced Quantitative Analysis. The complete analysis of complex minerals, and other determinations presenting more than ordinary difficulties.

Lab., 10 hrs.; 10 units.

249–a. Organic Chemistry Laboratory: Preparations.

Advanced organic synthesis, involving special training in organic laboratory technique. Lab., 10 hrs.; 10 units.

250–b. Organic Chemistry Laboratory—Qualitative Analysis. The reactions and properties of organic compounds. Use of group reactions in the identification of organic substances.

Lab., 10 hrs.; 10 units.

251–c. Organic Chemistry Laboratory—Quantitative Analysis. The combustion for carbon and hydrogen, Dumas nitrogen, Kjeldahl nitrogen, estimation of halogens, of sulphur and of organic radicals. The work will include some micro determinations.

Lab., 10 hrs.; 10 units.

252–a. Organic Chemistry. The chemistry of the Polynuclear Compounds and Heterocycles.

Lec., 2 hrs.; prep., 5½ hrs.; 7½ units.

253–b. Organic Chemistry. Carbohydrates.

Lec., 2 hrs.; prep., 5½ hrs.; 7½ units.

254–c. Organic Chemistry. Special topics and theories of organic chemistry.

Lec., 2 hrs.; prep., 5½ hrs.; 7½ units.

260–a, 261–b, 262–c. Physical Chemistry. An advanced course using Noyes and Sherrill's "Chemical Principles" and Taylor's "Treatise on Physical Chemistry" as references.

Lec., 2 hrs.; prep., 5½ hrs.; 7½ units.

This course is primarily for graduate assistants in Chemistry, and will be given in alternate years beginning in 1931–32.

270–a, 271–b, 272–c. Seminar. Presentation and discussion of recent investigations in the field of Chemistry.

Lec., 1 hr.; prep., 1½ hrs.; 2½ units.

280–a, 281–b, 282–c. Research for the Master's Degree.

Credit arranged.

EDUCATION AND PSYCHOLOGY

JUSTIN O. WELLMAN, *Professor*
HARLAN M. BISBEE, *Associate Professor*
ADOLPH G. EKDAHL, *Associate Professor*
NAOMI M. G. EKDAHL, *Assistant Professor*
JOHN C. HERRING, *Instructor*

EDUCATION

The objectives for graduate students in Education are a sound educational philosophy, expertness in research, and technical efficiency in administration and supervision.

Students whose undergraduate records or whose technical experiences are prognostic of success in attaining the above objectives will be admitted to graduate study in Education.

Candidates for a Master's degree must present, in addition to a Bachelor's degree, 50 time units in Education from the following courses, or their equivalents: Education 21–a, 22–b, 23–c, 31–a, 32–b, 33–c, 38–a,

39–b, 40–c, 41–a–b–c, and 44–c. One year of successful teaching experience will be considered to be equivalent to Education 41–a–b–c.

Candidates will be counselled to project a year of work which will permit concentration in: (1) Educational Psychology, (2) Educational Philosophy, (3) Administration and Supervision, or (4) Teaching Technique.

31–a. Psychology of Childhood. An intensive study of the development of the mind from childhood to adolescence. A careful interpretation of the development of the individual's mental processes with a view to proper methods of education is given special attention. Lectures, problems, assigned readings and discussions. Assistant Professor Ekdahl.

Accepted jointly with 32–b or 33–c for State Secondary Certificate. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

32–b. Psychology of Adolescence. The purpose of this course is to give high school principals and teachers a deeper appreciation of the habitual and impulsive life of boys and girls in their teens. Topics: preadolescence; the physical and mental traits of high school pupils; individual differences among high school pupils and their implications; motor training, gymnastics, athletics, play, sport, and games as they function in the education of the youth; growth of social ideas; adaptation of school work to intellectual development; moral and religious training. Lectures, problems, assigned readings and discussions. Assistant Professor Ekdahl.

Prerequisite: Education 31–a. Accepted jointly with 31–a for a State Secondary Certificate. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

33–c. Psychology of Learning. This course considers the nature of learning and retention, and their neural bases; learning curves, their uses and significance; forms of learning; motives to learning; factors and conditions affecting the rate and permanency of learning; problems relating to learning capacity; transfer of training, and means of effecting beneficial transfers; applications to practical school work, and to the training of persons requiring special treatment. Lectures, assigned readings and discussions. Assistant Professor Ekdahl.

Prerequisite: Education 32–b. Accepted jointly with 31–a, for the State Secondary Certificate. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

35–a. Measurements and Statistics. This course deals with the

principles, methods and application of various types of scales for measuring general mental ability and educational achievement. It includes a brief survey of statistical methods essential to an understanding of testing. Sufficient practice in giving tests is provided to give the student an appreciation of psychological methods of procedure. Assistant Professor Ekdahl.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

36–b. The Measurement of Achievement. This course will furnish an opportunity to study the results of education as measured by evidences that children are learning. Some of the topics discussed are: school marks; the development of standard tests; the study of diagnostic and prognostic tests; the interpretation of the results of achievement tests; how to develop scales in various secondary school subjects; the effects of measurements on examinations, scholarship marks, methods, supervision, courses and the like. Lectures, assigned readings, problems, and discussions. Assistant Professor Ekdahl.

Prerequisite: Education 35–a. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

37–c. Measurement of Aptitudes and Mental Alertness. This course will concern itself with the problem of analyzing various types of intelligence. It deals with the chief facts of normal, mental, physiological, and anatomical development as a basis for differentiation in classroom procedure. Some attention will be given to the problem of adjustment among super-normal and sub-normal pupils. A technique of the administration of group and individual tests is studied and emphasis is laid upon performance tests. Lectures, assigned readings, problems, and discussions. Assistant Professor Ekdahl.

Prerequisite: Education 36–b. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

38–a. Secondary Education in the Junior High School. The evolution of the junior high school; its particular features and functions; the attempt to humanize the education of adolescents and advance the cause of democracy are some of the topics discussed. Considerable attention is given to the program of studies for and administration of junior high schools. Consideration is given in this course to extra-classroom activities and their articulation with classroom procedures. Lectures, assigned readings, problems, discussions.Professor Wellman and Associate Professor Bisbee.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

39–b. Secondary Education. Evolution of secondary schools, their articulation with elementary schools, colleges, technical institutes, vocations, and the home; teaching staff; curriculum; student organizations; life guidance; aims and values of the various high school subjects; extra-curricular activities. Lectures, assigned readings, problems and discussions. Professor Wellman and Associate Professor Bisbee.

Prerequisite: Education 38–a. Accepted for State Secondary Certificate. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

40–c. Classroom Methods. A consideration of the purposes of high school instruction; selection and arrangement of subject matter; types of learning involved in high school subjects; the place of practice or drill; the significance of reflective thinking and correct habit formation; the art of questioning; directed study; the measurement of the results of teaching. Lectures, assigned readings, problems and discussions. Professor Wellman and Associate Professor Bisbee.

Prerequisite: Education 39–b. Accepted for a State Secondary Certificate. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

40.4–a. The Teaching of History in Secondary Schools. Professor Wellman.

40.7–b. The Teaching of Science in Secondary Schools. Professor Wellman.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

42–a. History and Principles of Vocational Education. The historical development of vocational education. The psychological and sociological bases of vocational education; problems, institutions, methods, contemporary movements and legislation; applications of research in relating vocations and education. Lectures, assigned readings and discussions. Mr. Herring.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

43–b. Mental Hygiene. This course will consider some of the more important chapters in modern school hygiene: conditions that determine growth and development, physiological age, the physical and mental differences between children and adults, the general principles of somatic and mental hygiene, tests of ability to work and physical condition, medical inspection, the development of habits of healthful mental activity and the hygienic aspects of various school exercises. Lectures, assigned readings, cases and discussions. Assistant Professor Ekdahl.

Prerequisite: Education 31–a. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

45–a. School Administration. A subject in the fundamental principles of school administration intended primarily for superintendents, and for those who are preparing to become superintendents or supervisors, or directors of educational research. Topics: principles of scientific management applied to school administration; school records and reports; problems of school finance; judging school buildings; special schools; special phases of school work as health education, compulsory attendance; the training of school superintendents and supervisors; the uses of school surveys; the publicity work of a school system. Reference reports on special topics and discussions. Associate Professor Bisbee.

Open especially to men and women with teaching experience, or to those who have had several Education courses and wish to prepare themselves for supervisory positions. Admission by consent of the instructor. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

46–b. High School Administration. The following topics will be covered: the legal status of the secondary high school; high school population; the problem of reorganization; the program of studies; vocational education and guidance in the high school; grading, measurement, classification, excess credit for quality; enrolling the student; social organization; community relationships; the high school library, staff, buildings, costs and efficiency, in general. Lectures, assigned readings and discussions. Associate Professor Bisbee.

Open especially to both men and women who wish to become principals or headmasters. Admission by consent of the instructor. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

47–c. Principles of Education. Selected biological, psychological, sociological and statistical material will be treated in such way as to give the student not only a survey of the fundamental principles of education, but also a good basis for more intensive courses in education. Educational theory stressing the more important principles involved in the process of education especially in the secondary schools. Lectures, assigned readings and discussions. Associate Professor Bisbee.

Open to men and women who wish to become administrators or supervisors. Admission by consent of instructor. Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

48–b. Agriculture in the High School. This subject deals with special methods of teaching agriculture in the high school, with emphasis upon New Hampshire requirements as set up by the State Board of Education. The chief topics considered are: planning and equipping of class-

rooms and shops, selection of reference books, use and construction of charts and illustrative materials, the curriculum, the yearly plan of work; the presentation of materials of instruction through recitation, laboratory, field work and excursions; teaching through the home project, and supervised study. Mr. Little.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

52–a. Educational Problems. (Democracy in Education and Character Development.) This course will discuss student participation in high school control; social functions, their nature, supervision, time, and place. The underlying principles of club work, together with a discussion of organization and administration of typical clubs of senior high schools, will be given careful attention. The problem of character education and a discussion of the moral standards in our high schools as revealed by investigations will furnish the student with concrete evidence in this interesting field. Lectures, assigned readings, problems, and problems of research. Associate Professor Bisbee.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

53–b. Educational Problems. (Educational and Vocational Guidance.) This course endeavors to make clear the problems with which the school counselor, the employment manager, and the intelligent individual himself have to deal. It discusses the beginnings of the guidance, pseudo-guidance, counselors' work in junior and senior high schools, and shows the intelligent student how he may guide himself, the methods of securing a position and obtaining advancement. Lectures, assigned readings, projects, problems, case studies with special reports. Professor Wellman.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

54–c. Educational Problems. (The Psychology of Management.) This course is designed to help those who are concerned with administration and supervision, whether in the teaching profession or in any business occupation, to establish and maintain that human efficiency which results from high group morale. There will be a discussion of teacher participation through advisory council, shop committee plans, and other means of promoting democracy in the field of management. Three-tenths of the time of this course will be devoted to the consideration of the psychology of camp leadership and special lectures will be introduced through the coöperation of the college Y. M. C. A. and Y. W. C. A. The camp leadership section will be open to all students and will carry three

time units credit. Projects, problems, topical reports and discussions. Mr. Herring.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

55–a, 56–b, 57–c. Special Problems in Educational Psychology. In this course an opportunity is afforded for intensive experimental and statistical work in Educational Psychology. Special problems may be carried over two or more terms.

101–a, 102–b, 103–c. Research in Administration and Supervision. To be arranged.

PSYCHOLOGY

37–a. Experimental Psychology. Simple experiments on the sensations. Emphasis will be given toward the development of the proper technique of psychological investigation.

Lec. and lab., 6 hrs.; prep., 4 hrs.; 10 units.

38–b. Experimental Psychology. Experiments on the complex mental processes involving perception, association, imagination, learning and reaction time.

Lec. and lab., 6 hrs.; prep., 4 hrs.; 10 units.

39–c. Experimental Psychology. Psychophysical measurements, the determination of Weber constants, limens of sensibility, etc.

Lec. and lab., 6 hrs.; prep., 4 hrs.; 10 units.

47–a. Physiological Psychology. A study of the physical basis of mind, nerve functions and their correlations with mental processes.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

48–b. Comparative Psychology. A study of psycho-genesis or the development of "mind" beginning with the one-celled organisms.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

49–c. Abnormal Psychology. A study of abnormal phenomena such as disorders of perception, association, memory, judgment and personality. The psychoses and psychoneuroses will be considered and a brief review of mental deficiency presented. Visits to institutions.

Lec. or rec., 3 hrs.; prep., 7 hrs.; 10 units.

51–a, 52–b, 53–c. Seminar. Special Problems in Psychology. Credit to be arranged.

104–a, 105–b, 106–c. Research in Psychology. Problems of either an experimental or theoretical nature may be pursued. Credit to be arranged.

ENGLISH

ALFRED E. RICHARDS, *Professor*
HAROLD H. SCUDDER, *Professor*
WILLIAM G. HENNESSY, *Associate Professor*
PAUL S. SCHOEDINGER, *Assistant Professor*
CARROLL S. TOWLE, *Assistant Professor*

The candidate for an advanced degree who selects English as his major subject must have a reading knowledge of French and German, or of Latin and German.

COURSES FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS

31–a, 32–b. English Literature of the Restoration. The period from Dryden to Swift. Special attention will be given to the English social and political life of the period in its connection with the literature. Consideration will be given, also, to the early history of journalism and of English literary criticism. One hour of the week will be devoted to round-table discussion with small groups. (Not given in 1932–33.)

57–b, 58–c. The English Romantic Movement. The period from 1780 to 1830, with study of early romantic writers and the causes and characteristics of the movement. Special emphasis is laid upon the poetry of Wordsworth, Coleridge, Byron, Shelley and Keats. One hour of the week will be devoted to round-table discussion with small groups.

Lec., 2 hrs.; disc., 1 hr.; prep., 6 hrs.; 9 units.

61–a, 62–b. Milton. A detailed study of Milton's minor poetry and *Paradise Lost.* Consideration is also given to the social, political and religious history of Milton's day as reflected in his life and poetry.

Lec. or rec., 3 hrs.; prep., 6 hrs.; 9 units. No credit is given for only one term's work.

59–a, 60–b. The English Novel in the Eighteenth Century. The novel from Defoe through the Gothic romance. (Not given in 1932–33.)

Lec. or rec., 2 hrs.; prep., 7 hrs.; 9 units.

63–a, 64–b. The English Novel in the Nineteenth Century. A study of the novel from Jane Austen to Thomas Hardy.

Lec. or rec., 2 hrs.; prep., 7 hrs.; 9 units.

67–a, 68–b, 69–c. Shakespeare's Plays. A study of the principal plays of Shakespeare.

Lec. or rec., 3 hrs.; prep., 6 hrs.; 9 units.

70–c. An Introduction to Drama. A survey of the field of drama, beginning with the drama of Greece and ending with that of Ibsen.

Lec. or rec., 3 hrs.; prep., 6 hrs.; 9 units.

72–c. Contemporary Drama. Modern British and Continental drama from Ibsen to the present. Theories, types and developments. (Not given in 1932–33.)

75–a, 76–b. The English Language. A study of the origin and growth of the English language. First term, Old English; second term, Middle and Modern English.

Lec. or rec., 3 hrs.; prep., 6 hrs.; 9 units.

77–b, 78–c. Chaucer. A study of Chaucer's life and times, and a reading of his works. First term, his minor poems; second term, *The Canterbury Tales.*

Lec. or rec., 3 hrs.; prep., 6 hrs.; 9 units.

Courses Primarily for Graduate Students

301–a, 302–b, 303–c. Collateral Reading. The reading and discussing of selected masterpieces from the literature of the world. A term paper required of each student.

Lec. or rec., 3 hrs.; prep., 9 hrs.; 12 units. (Formerly given as 101–a, 102–b, 103–c.)

304–a, –b, –c. A study of the Faust legend as it is found in the literature of Germany and of England. Special attention is given to Marlowe's drama and to the later forms of the legend in English literature.

Lec. or rec., 3 hrs.; prep., 9 hrs.; 12 units.

ENTOMOLOGY

W. C. O'Kane, *Professor*
J. G. Conklin, *Instructor*

The aim of graduate study in this department is to prepare a student for professional work in one or more of the several specialized divisions of Economic Entomology. Such preparation requires more time and effort than that represented by the four years of undergraduate college work. It assumes that in his undergraduate studies the student has laid a groundwork of general entomology and appropriate related sciences.

The student who wishes to enter graduate work will be expected to

present such a foundation, its details depending on the phase of professional entomology in which the student desires to specialize. Related sciences presented may include courses in zoölogy, chemistry, botany, plant pathology, bacteriology, horticulture, or physics, in various combinations. Consultation with the head of the Department of Entomology will determine the prerequisites necessary in a given case.

Courses for Advanced Undergraduate and Graduate Students

Under suitable circumstances graduate credit may be obtained for the following courses, which are open also to undergraduates, provided the permission of the head of the Department of Entomology is secured, and provided that the graduate student completes additional work in these courses and attains superior grades.

2–a. Insects of Orchard and Garden. The application of methods of insect control to typical injurious species. Studies in the life histories and habits of important insect pests of orchard, garden and certain field crops.

Prerequisite: Entomology 1–a. Lec., 2 hrs.; lab., 2½ hrs.; prep., 3 hrs.; 7½ units. Given in alternate years beginning with 1933–34.

3–b. Insects of Domestic Animals. The insect enemies of domestic livestock; the life histories, habits and means of control.

Prerequisite: Entomology 1–a. Lec., 2 hrs.; lab., 2½ hrs.; prep., 3 hrs.; 7½ units. Given in alternate years beginning 1932–33.

4–c. Household Insects. Medical Entomology. The life histories, habits and means of control of insects of the household and of stored products. The relation of insects to disease.

Lec., 2 hrs.; lab., 2½ hrs.; prep., 3 hrs.; 7½ units.

5–a, 6–b, 7–c. Advanced Economic Entomology. Detailed studies of subjects involved in applied entomology. The literature of economic entomology. Investigational practice. Original studies in the life history and habits of injurious species. Adapted for advanced students.

Required of students specializing in Entomology. Hours and units to be arranged.

8–a, 9–b, 10–c. Advanced Economic Entomology. Continuation of Entomology 5–a, 6–b, 7–c for students who are specializing in the subject.

Required of students specializing in Entomology. Hours and units to be arranged.

13–c. Forest Insects. Studies in the life histories and habits of the more destructive forest insects and the means of their control.

Prerequisite: Entomology 1–a. Elective for others. Lec., 2 hrs.; lab., 2½ hrs.; prep., 3 hrs.; 7½ units.

Courses Primarily for Graduate Students

The following courses represent a sequence of studies arranged to include such branches as insect anatomy, insect physiology, details of taxonomy, insect behavior, insect ecology, problems in dispersion, the organization of research, the organization of regulatory measures, and other phases involved in professional entomology. The sequence includes, also, the planning and prosecution of a problem in research, with presentation of the results in the form of a thesis.

14–a, 15–b, 16–c. Graduate Entomology.

Prerequisites: Entomology 5–a to 7–c, or the equivalent. Units and hours to be arranged.

17–a, 18–b, 19–c. Graduate Entomology.

Prerequisites: Entomology 5–a to 7–c, or the equivalent. Units and hours to be arranged.

HISTORY

Donald C. Babcock, *Professor*
Arthur W. Jones, *Assistant Professor*
Allan B. Partridge, *Assistant Professor*
Philip M. Marston, *Assistant Professor*
William Yale, *Instructor*

Admission to Graduate Study.

1. The completion of 90 time units, or the equivalent thereof, in History, exclusive of History 1–a, 2–b, 3–c, and with an average grade of 75 or better.
2. The understanding that the earning of graduate credit implies
   (a) A "passing grade" of 85 in courses taken in the same class with undergraduates.
   (b) A "passing grade" of 80 in other courses.
   (c) An additional 20% of work to be done as an extra assignment in classes with undergraduates.

(d) A willingness and a desire to do more than the required minimum, especially as regards collateral reading.

Admission to Candidacy.

1. Reading knowledge of a foreign language.
2. A comprehensive examination in the field of general history.
3. Favorable judgment of the head of the department as well as of the Dean of the Graduate School.

Objectives: In general, two classes of graduate students may find it profitable to do their major work in this department. The first consists of students who desire a more extended knowledge and a more complete historical background to round out a liberal education, and perhaps to prepare them for the teaching of history. The second consists of those who wish to specialize on some phase of New England history, preferably that of New Hampshire.

Plan of Work: General Course. All graduate students in this department will include in their programs, at an early date, course **1–g, Historic Survey.** At some later period they will include **2–g** and **3–g, Historic Reading and Theory.** They will also enroll for some part of the year's work indicated by the courses **10–g, 11–g, 12–g, Thesis.** Those not specializing in New England history will complete their major work from courses listed in the general catalog.

Special Course. Students specializing in the history of New England will be expected to choose as a subject for the thesis some topic within this field. For this purpose the available facilities for research are considerable, including the libraries of this and other universities, the State Library and the Library of the Historical Society in Concord, and various town records, private documents, unrecorded personal memoirs, landmarks, etc. A part of the work of this department is conceived to be the discovery and conservation of source material existing in the material and mental accumulations of the older type of New England population.

Courses **4–g–9–g** inclusive are designed for students of New England history. These courses are not given in class work.

Courses Restricted to Graduate Students

1–g. Historic Survey.
2–g, 3–g. Historic Reading and Theory.
4–g, 5–g, 6–g. New England History.
7–g, 8–g, 9–g. New Hampshire History.
10–g, 11–g, 12–g. Thesis.

HORTICULTURE

GEORGE F. POTTER, *Professor*
J. RAYMOND HEPLER, *Associate Professor*
L. PHELPS LATIMER, *Assistant Professor*

Graduate work in Horticulture is offered to students who desire training for professional work, and who have fulfilled the requirements for undergraduate students majoring in Horticulture at this or a similar institution. A reading knowledge of French and German is desirable. The student should also have had sufficient practical experience to enable him to understand and appreciate the problems of Horticulture.

Students will find the department well equipped for fundamental research on horticultural problems.

COURSES FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS

5–a. Systematic Survey of Fruits and Vegetables. A study of the more important species of fruits or vegetables and their botanical relationships.

Lec., 2 hrs.; prep., 3 hrs.; 5 units.

6–b. Advanced Pomology. A detailed study of fundamental principles and experimental data and their application and relation to orchard problems such as growth and rest period in fruit plants, water requirements, soil management, pruning, fruit bud formation, fruit setting, pollination, thinning, winter injury, and the quality and keeping period of fruits in storage.

Lec., 3 hrs.; prep., 5 hrs.; 8 units.

10–b. Evolution and Improvement of Plants. The application of the principles of genetics to agricultural plant breeding. Hybridization and selection are studied as means of improving horticultural varieties of plants.

Prerequisite: Zoölogy 32–a. Lec., 2 hrs.; prep., 3 hrs.; 5 units. Given in alternate years beginning 1933–34.

12–a, 12.5–b. Horticultural Seminar. A review of the recent horticultural literature and methods of investigational work.

Lec., 2 hrs.; prep., 2 hrs.; 4 units.

COURSES PRIMARILY FOR GRADUATE STUDENTS

101–b. Problems in Flower Bud Formation. A discussion of scientific and experimental evidence bearing on flower formation, growth, and composition of fruit plants, alternate bearing of apples, and soil management and fertilization of orchards.

Lec., 3 hrs.; prep., 9 hrs.; 12 units.

102–b. Methods of Horticultural Research. An examination of methods used in laboratory and field by horticultural investigators.

Lec., 2 hrs.; prep., 4 hrs.; 6 units.

103–a. Problems in Winter Injury. The physiology of winter injury to fruit plants.

Lec., 2 hrs.; prep., 6 hrs.; 8 units.

104–b. Physiological Problems in Propagation and Growth. The problems of water relations, rest period, propagation, pruning and thinning of orchard fruits.

Lec., 3 hrs.; prep., 9 hrs.; 12 units.

105–c. Problems in Pollination and Fruit Storage. The experimental evidence dealing with pollination, fruit setting, color development, and storage of fruits.

Lec., 2 hrs.; prep., 6 hrs.; 8 units.

106–a. Problems in Vegetable Production. A critical study of the physiological problems involved in vegetable production.

Lec., 3 hrs.; prep., 9 hrs.; 12 units.

125–a. Research in Horticulture. Units to be arranged.

LANGUAGES

CLIFFORD S. PARKER, *Professor*
J. HERBERT MARCEAU, *Associate Professor*
JOHN STEPHEN WALSH, *Associate Professor*
PAUL P. GRIGAUT, *Assistant Professor*

To pursue graduate work in French, an applicant, if a graduate of the University of New Hampshire, must have passed 90 time units of undergraduate work in French, and must have demonstrated his fitness for

work in the graduate courses offered by this department. If a graduate of another institution, an applicant must show by his record and by his knowledge of French that he is prepared to undertake the work.

Courses for Advanced Undergraduate and Graduate Students

FRENCH

16–a, 17–b, 18–c. Romanticism and Realism in French Literature of the Nineteenth Century. Prose and poetry of the more important writers with lectures and outside reading.

Prerequisite: French 9–c, or equivalent. Lec. or rec., 3 hrs.; 10 units.

19–a, 20–b, 21–c. Recent Tendencies in French Literature. Studies of the tendencies in French literature from 1870 to the present. This course is open to a limited number of qualified undergraduates and to graduate students. Permission of the instructor is required before enrollment.

Lec. or rec., 3 hrs.; 12 units.

22–a, 23–b, 24–c. French Grammar. A systematic study of French grammar in all its phases from elementary to highly advanced.

Rec., 3 hrs.; 10 units.

40–a, 41–b, 42–c. Lecture Course in French. On French literature, history, art, and civilization from the beginnings to the Revolution, with written and oral quizzes and reports.

Lec., 3 hrs.; 10 units.

Courses for Graduate Students Only

101–a, 102–b, 103–c. French Literature of the 16th Century. A study of the literature of the French Renaissance, with especial emphasis on the work of Rabelais, Ronsard, and Montaigne.

Lec. or rec., 3 hrs.; 12 units.

107–a, 108–b, 109–c. Foreign Influences on French Literature. The study of the influences of other countries upon French literature particularly during the 18th, 19th and 20th centuries.

Lec. or rec., 3 hrs.; 12 units.

LATIN

The following courses, sufficient to satisfy minor requirements for students approved by the department will be offered in 1932–33.

10–a, 11–b, 12–c. A Comprehensive View of the Latin Literature of the Golden Age.

The works of Cæsar, Cicero and Virgil will be studied for their literary and historic value.

The history of Rome during the Golden Age will be studied in order to provide the background necessary to the student or teacher of the classics.

3 hrs.; 10 units.

13–a, 14–b, 15–c. Latin Composition. Translation of English prose and poerty beginning with the fundamentals of composition and progressing to a study of prose style and effective idiomatic expression.

3 hrs.; 10 units.

MATHEMATICS

HERMON L. SLOBIN, *Professor*
WALTER E. WILBUR, *Assistant Professor*
MARVIN R. SOLT, *Assistant Professor*
MILTIADES S. DEMOS, *Assistant Professor*

COURSES FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS

10–a, 11–b, 12–c. Differential Equations and Applications to Engineering Problems. Professor Slobin.

Prerequisite: Mathematics 9. Rec., 3 hrs.; 9 units.

14–b, 15–c. The History of Mathematics. This course is designed especially for those preparing to teach mathematics in the high schools. It aims to give an historical background and an appreciation of the development of various fields of mathematics. Assistant Professor Wilbur.

Prerequisite: Mathematics 9. Rec., 3 hrs.; 7½ units.

16–a, 17–b, 18–c. Secondary School Mathematics. A study of the content and the method of teaching secondary school mathematics. Assistant Professor Wilbur.

Prerequisite: Mathematics 3. This course carries graduate credit only for students whose major is Education. Rec., 3 hrs.; 7½ units.

30–a, 31–b, 32–c. Advanced Plane and Solid Analytical Geometry. Assistant Professor Solt.

Prerequisite: Mathematics 9. Rec., 3 hrs.; 9 units.

COURSES PRIMARILY FOR GRADUATE STUDENTS

50–a, 51–b, 52–c. Sequences and Series. An introduction to advanced analysis. Professor Slobin.

Prerequisite: Mathematics 9. Rec., 3 hrs.; 9 units.

60–a, 61–b, 62–c. Selected Topics in the Theory of Functions of a Real Variable. Professor Slobin.

Prerequisite: Mathematics 9. Rec., 3 hrs.; 9 units.

70–a, 71–b, 72–c. Selected Topics in the Theory of Functions of a Complex Variable. Assistant Professor Demos.

Prerequisite: Mathematics 9. Rec., 3 hrs.; 9 units.

80–a, 81–b, 82–c. Advanced Algebra. The following topics will be treated in this course: matrix theory, including elementary divisors and invariant factors; linear transformations; quadratic, bilinear, and Hermitian forms; invariants and covariants with geometric applications; and topics from the theory of equations, including symmetric functions, and groups of substitutions. Assistant Professor Demos.

Prerequisite: Mathematics 9. Rec., 3 hrs.; 9 units.

POULTRY HUSBANDRY

T. BURR CHARLES, *Professor*
CARL L. MARTIN, *Assistant Professor*
CHARLES BOTTORFF, *Instructor*
ALBERT E. TEPPER, *Instructor*

A student desiring to take graduate work in Poultry Husbandry should offer as a prerequisite an undergraduate training in this field. He should also have sufficient practical experience to enable him to understand and appreciate the problems of poultry keeping.

COURSES FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS

100-a, 101-b, 102-c. Poultry Diseases. An advanced course treating on etiology, treatment, prevention and dissemination of specific poultry diseases. Prerequisites: Poultry Husbandry 6-b or equivalent and a course in general bacteriology.

Lec. or rec., 3 hrs.; lab., 4 hrs.; prep., 3 hrs.; 10 units.

103-a, 104-b, 105-c. Poultry Breeding. The application of the principles of genetics to poultry breeding; hybrid crosses; sex-linkage as affecting the commercial poultrymen. Prerequisites: Poultry Husbandry 10-a, 23-b or their equivalents. It is preferably preceded by a study of Genetics (Zoölogy 32-a).

Lec. or rec., 3 hrs.; lab., 4 hrs.; prep., 3 hrs.; 10 units.

106-a, 107-b, 108-c. Poultry Nutrition. A course treating on the effects of food constituents and the laws and principles governing nutrient requirements. Prerequisites: 9-c and Agricultural Chemistry 4-b.

Lec. or rec., 3 hrs.; lab., 4 hrs.; prep., 3 hrs.; 10 units.

109-a, 110-b, 111-c. Special Problems. Incubation, brooding, battery brooding, management, breeding, marketing, nutrition, diseases, etc. By special permission. Units to be arranged.

112-a, 113-b, 114-c. Poultry Seminar. 3 units each.

SOCIOLOGY

ALBERT N. FRENCH, *Professor*

Prerequisites for majoring in Sociology include Group A courses, including principles of sociology, etc. (See undergraduate catalog.)

For majoring 100 time units are required in Sociology and closely related minor fields, in addition to the 50 units which may be given for a thesis, which thesis must be jointly approved by the department head and the Dean of the Graduate School. In addition to the basic work outlined below, combinations may be arranged with (1) Philosophy and Psychology, (2) Social Science, inclusive of History, (3) Zoölogy, (4) English, (5) Education, (6) Statistics, understanding that special approval of the Dean of the Graduate School is necessary to combine offerings in more than two of the above fields.

Professional: Students expecting to enter post-graduate schools in social work should plan constructively for these programs by minoring in the necessary related fields.

SOCIAL PSYCHOLOGY AND SOCIAL THEORY

17–a. Social Psychology. An analytic study of human behavior and of its interpretation. 9 units.

18–b. Societal Psychology. A further analytic study of social psychology in terms of social dynamics, social philosophy, etc. (The work of the undergraduate class will be supplemented by systematically directed research, based on methods adequately developed in the graduate seminar or related courses.) 9 units.

19–c. Social Dynamics. A synthetic study of the principles of social change, conflict and re-education, in the light of recent research in philosophy, biology, psychology, and closely related social sciences. (In addition to undergraduate work in Social Dynamics and Social Emergence (22–c), readings in contemporary sociology will be required.) 9 units.

SOCIAL RESEARCH

27–a. Criminology. An analysis of five hundred criminal careers, utilizing the case study and scientific-human methods. (Students taking this course should also enroll for 30–a.) 9 units.

30–c. Case Work (Theory and Survey). The study of social diagnosis and the technic of case work. 9 units. (Formerly given as 29.5–c.)

50–a, 51–b, 52–c. Seminar: Sociological Research. Credit to be arranged. (Formerly given as 30–a, 31–b, 32–c.)

THESIS

34–a, b, c. Thesis. Research incident to an approved thesis topic. Credit to be arranged.

ZOÖLOGY

C. F. Jackson, *Professor*
A. D. Jackson, *Associate Professor*
E. T. Richardson, *Assistant Professor*
D. G. Barton, *Assistant Professor*

The special requirements for graduate work in Zoölogy include a thorough foundation in the principles of zoölogy, and the equivalent of 150 units in this and allied sciences.

Courses for Advanced Undergraduate and Graduate Students

36-a, 37-b, 38-c. Histology.

Lec. or rec., 2 hrs.; lab., 6 hrs.; prep., 4 hrs.; 12 units.

39-a, 40-b, 41-c. Embryology.

Lec. or rec., 3 hrs.; lab., 4 hrs.; prep., 5 hrs.; 12 units.

42-a, 43-b, 44-c. Advanced Physiology.

Lec. or rec., 3 hrs.; lab., 4 hrs.; prep., 5 hrs.; 12 units.

48-a, 49-b, 50-c. Cytology and Genetics.

Lec. or rec., 3 hrs.; lab., 2½ hrs.; prep., 6½ hrs.; 12 units.

51-a, 52-b, 53-c. Advanced Neurology.

Lec. or rec., 3 hrs.; lab., 2½ hrs.; prep., 6½ hrs.; 12 units.

60-s. Invertebrate Morphology and Taxonomy.

Lec. or rec., 5 hrs.; lab., 5 hrs.; prep., 10 hrs.; 10 units.

61-s. Vertebrate Ecology.

Lec. or rec., 3 hrs.; lab., 4 hrs.; prep., 10 hrs.; 10 units.

62-s. Comparative Embryology.

Lec. or rec., 5 hrs.; lab., 5 hrs.; prep., 10 hrs.; 10 units.

63-s. Advanced Comparative Anatomy of Vertebrates.

Lec. or rec., 5 hrs.; lab., 5 hrs.; prep., 10 hrs.; 10 units.

Courses Primarily for Graduate Students

80-a, 81-b, 82-c. Advanced Taxonomy. Critical examination of select groups of vertebrates and invertebrates with special reference to local forms, their classification, distribution, and phylogeny.

Prerequisites: Three years' work in Zoölogy. Lec. or rec., 2 hrs.; lab., 4 hrs.; prep., 4 hrs.; 10 units.

83–a, 84–b, 85–c. Advanced Comparative Morphology. A critical and detailed study of the structure and function of aberrant forms and a comparison with the types of the group to which they belong.

Prerequisites: Three years' work in Zoölogy. Lec. or rec., 2 hrs.; lab., 6 hrs.; prep., 2 hrs.; 10 units.

86–a, 87–b, 88–c. Advanced Vertebrate Ecology. A study of advanced ecological problems and their correlation with morphology, physiology, and taxonomy as exemplified by local associations and cenoses.

Rec. or lec., 2 hrs.; lab., 4 hrs.; prep., 4 hrs.; 10 units.

89–a, 90–b, 91–c. Experimental Genetics. Studies of the effect of hormones, introduced toxins, or drugs on the germ plasm or modification of the offspring when such drugs are given to the parent. The relation of chromosomes to inheritance will be considered experimentally.

Prerequisites: Three years' work in Zoölogy, including Genetics. Lec. or rec., 1 hr.; lab., 6 hrs.; prep., 3 hrs.; 10 units.

92–a, 93–b, 94–c. Comparative Embryology. A detailed study of the embryonic history of selected types of animals with special emphasis on basic embryological principles.

Prerequisites: Three years' work in Zoölogy, including Embryology. Lec. or rec., 3 hrs.; lab., 4 hrs.; prep., 3 hrs.; 10 units.

99–a–b–c. Special Problems. Advanced students may elect this work provided they present a detailed outline of the problems which they wish to investigate and, furthermore, provided they can furnish adequate proof of their ability to carry the problem in view of their past training and the equipment available.

Prerequisite: By special permission. Units to be arranged.

GRADUATE STUDENTS

Name	Course	P. O. Address
Alexander, Jessie Geneva, B.A. Colby, 1929	*Major French*	*Augusta, Maine*
Anderson, Ernest William, B.S. Virginia, 1931	*Major Chemistry*	*Portsmouth, Va.*
Baldwin, Hollis Walter, B.S. New Hampshire, 1930	*Major Education* *Minor History*	*Colebrook*
Barnett, Harriet Isabelle, B.S. New Hampshire, 1925	*Major Education*	*Whitefield*
Boulanger, Edmee Adeline, B.A. New Hampshire, 1931	*Major French* *Minor Education*	*Dover*
Brannen, Mildred Evelyn, B.A. New Hampshire, 1929	*Major History* *Minor English*	*Amesbury, Mass.*
Bryant, Floyd Goodwin, B.S. New Hampshire, 1931	*Major Zoölogy* *Minor Geology*	*Tilton*
Burkhart, Leland, B.S. Ohio State, 1931	*Major Agr. Bio. Chem.* *Minor Botany*	*Perrysburg, Ohio*
Charron, George Octave Eymard Seminary	*Major French* *Minor Education*	*Nashua*
Cook, Walter Woodworth, B.A. New Hampshire, 1929	*Major English*	*Manchester*
Creath, Cecil Vernon, B.S. Illinois, 1930	*Major Zoölogy* *Minor Botany*	*Sullivan, Ill.*
Crowther, Stephen Thomas, B.S. New Hampshire, 1930	*Major Education* *Minor Psychology*	*Derry Village*
Currie, Alexander Blackwood, B.S. New Hampshire, 1929	*Major Education* *Minor Science*	*Manchester*
Cushing, Merchant LeRoy, B.S. New Hampshire, 1931	*Major Chemistry*	*Plaistow*
Doe, Chester Winfield Harvard, 1910, A.B. Auburn, 1913, B.D.	*Major Education* *Minor English*	*Northwood*
Dow, Gordon Sumner, B.S. New Hampshire, 1929		*North Hampton*

Name	Course	P. O. Address
Faxon, George Ryder, B.A. Harvard, 1928	*Major Psychology* *Minor Education*	*Mattapan, Mass.*
Feehan, Ramos Chapman, B.E. Keene Normal, 1931	*Major History*	*Keene*
Fisher, Samuel Joseph, B.S. Penn. State, 1930	*Major Agr. Bio. Chem.* *Minor Zoölogy*	*Perkasie, Pa.*
Fletcher, Martha Wilmarth, B.A. Bates, 1928	*Major Education*	*Littleton*
Foote, Lewis Ford, B.S. New Hampshire, 1925	*Major Education*	*Lincoln*
Francis, Henry Russell, B.S. Mass. Agr. College, 1910	*Major Forestry* *Minor Economics*	*Fayetteville, N. Y.*
Gove, Ira Newman, B.S. New Hampshire, 1928	*Major Mathematics* *Minor Physics*	*Concord*
Griffin, Audrey, B.S. Boston University, 1931	*Major Education* *Minor Sociology*	*Manchester*
Hodgdon, Albion Reed, B.S. New Hampshire, 1930	*Major Botany* *Minor Chemistry*	*Dover*
Hounsell, William Booth, B.A. New Hampshire, 1930	*Major French* *Minor Latin*	*Durham*
Hunter, Howard Marston, B.S. Purdue, 1930	*Major Agr. Chemistry* *Minor Zoölogy*	*Hamilton, Ohio*
Jordan, Dana S., B.A. Bates, 1909	*Major Education*	*Littleton*
Kellam, David Bean, B.S. New Hampshire, 1930	*Major Agr. Chemistry* *Minor Chemistry*	*North Conway*
Ladd, Gwenyth Margaret, B.S. Boston University, 1931		*Barre, Vt.*
Lyford, Walter Henry, Jr., B.S. New Hampshire, 1930	*Major Chemistry* *Minor Agr. Chemistry*	*Epping*
McCann, James Philip, B.A. New Hampshire, 1930	*Major Education* *Minor History*	*Dover*
Mann, Philander Leon, B.S. New Hampshire, 1930	*Major Education* *Minor Sociology*	*East Concord*
Mattoon, Donald Potter, New Hampshire, 1922, B.S. New Hampshire, 1928, M.S.	*Major Education*	*Littleton*
Mayer, Flora Lillian, B.S. Salem Normal, 1929	*Major Education*	*Concord*

Name	Course	P. O. Address
Meserve, Cecille Agnes, B.S. Boston University, 1931	*Major Education* *Minor Sociology*	*Newbury, Vt.*
Monroe, Clyde Wentworth, B.S. R. I. State, 1931	*Major Zoölogy* *Minor Botany*	*Durham*
Morrison, Leonard Samuel, B.S. New Hampshire, 1910	*Major Education*	*Whitefield*
Osgood, James Diamond, B.S. New Hampshire, 1929	*Major Education*	*Pittsfield*
Paradis, Doris Viola, B.A. New Hampshire, 1930	*Major French*	*Somersworth*
Parker, Ralph Harthan, B.A. New Hampshire, 1917	*Major Education*	*Exeter*
Parkinson, Everton Harry Wesleyan, 1926, B.A. New Hampshire, 1931, M.S.	*Major Education*	*Whitefield*
Parris, Frances Kathleen, B.A. Wheaton, 1929	*Major Education*	*Colebrook*
Pease, Perley Henry, B.S. New Hampshire, 1926	*Major Education* *Minor Zoölogy*	*Exeter*
Perkins, Alice May, B.S. New Hampshire, 1927	*Major Education* *Minor Zoölogy*	*Dover*
Perkins, Donald Merrill, B.S. New Hampshire, 1931	*Major Mathematics* *Minor Physics*	*Sunapee*
Pitz, Donald, B.S. New Hampshire, 1931	*Major Chemistry*	*Durham*
Priest, Leona Frances, B.A. New Hampshire, 1930	*Major Education* *Minor English*	*Newmarket*
Richard, Marc Emilien, B.A. Assumption, 1931	*Major French* *Minor Education*	*Dover*
Richards, Robert Ladd, B.S. New Hampshire	*Major Zoölogy* *Minor Chemistry*	*Durham*
Riley, Matthew Howard, B.S. New Hampshire, 1931	*Major Mathematics* *Minor Education*	*Portsmouth*
Roberts, Harold, A.A. Harvard, 1931	*Major Education* *Minor Psychology*	*Rye Beach*
Robinson, Francis Edwin, B.A. New Hampshire, 1931	*Major English* *Minor History*	*Durham*
Smith, Frances Hayward, B.A. Smith, 1928	*Major Pol. Science* *Minor History*	*Pittsfield*

Name	Course	P. O. Address
Stuart, Neil Wade, B.S.	*Major Horticulture*	*Clarksville,*
Michigan State, 1929	*Minor Agr. Chemistry*	*Mich.*
Swain, Howard Eugene, B.S.	*Major Education*	*Exeter*
New Hampshire, 1916		
Taylor, Alfred Henry, B.S.	*Major Chemistry*	*Pearl River,*
New Hampshire, 1930	*Minor Bio. Chemistry*	*N. Y.*
Tebbetts, Lucy Mable, B.S.	*Major Language*	*Berwick,*
Boston University		*Maine*
Temple, George Franklin, B.S.	*Major Chemistry*	*Somersworth*
M. I. T., 1930		
Tetley, Ronald Edmund, B.S.	*Major Education*	*Laconia*
New Hampshire, 1929	*Minor Pol. Science*	
Thomas, Naomi Williams, B.A.	*Major History*	*Portsmouth,*
Richmond, 1929	*Minor Education*	*Va.*
Towle, Ruth Celia, B.S.	*Major Sociology*	*Conway*
New Hampshire, 1930	*Minor Zoölogy*	
Trent, George James, B.S.	*Major Education*	*Portsmouth*
New Hampshire, 1931	*Minor Zoölogy*	
Trombly, Lillian Oberlin, B.A.	*Major English*	*Concord*
New Hampshire, 1931	*Minor French*	
Truell, Harold Arthur, B.S.	*Major Education*	*Newport*
New Hampshire, 1930		
Varney, Elizabeth Adams, B.A.	*Major Psychology*	*Somersworth*
Wellesley, 1930	*Minor Education*	
Walker, Charles Monroe, B.A.	*Major Education*	*Chelmsford,*
New Hamsphire, 1931	*Minor English*	*Mass.*
Walker, George Louie, B.S.	*Major Entomology*	*Sumner,*
Miss. A. & M., 1931	*Minor Botany*	*Miss.*
Washburn, Lloyd Eugene, B.S.	*Major Agr. Bio. Chem.*	*Roaring*
Penn. State, 1931	*Minor Zoölogy*	*Branch, Pa.*
Weston, Helen Brown, B.S.	*Major Education*	*Whitefield*
New Hampshire, 1917	*Minor French*	
White, Elizabeth Alice, B.A.	*Major History*	*Rye Beach*
New Hampshire, 1927	*Minor Education*	
Winchester, Clarence Floyd, B.S.	*Major Agr. Chemistry*	*Durham*
California, 1924	*Minor Zoölogy*	